Management of an implant prosthetic complication

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This case presentation demonstrates the step-wise procedures used to solve a major prosthetic complication, i.e. malpositioned implants. The treatment encompassed thorough pre-treatment diagnostics in collaboration with the dental technician in order to analyse whether or not the osseointegrated implants could be used for a fixed reconstruction; the use of angulated and customised components to compensate for the misalignment of the implants; and the fabrication of resin-veneered screw-retained fixed implant bridges in the upper and lower jaws.

The male patient (1937, Figure 1) was referred to the Clinic of Fixed Prosthodontics and Material Sciences, University of Zurich, for final prosthetic treatment. The implants had been placed in a private practice several months earlier, and a screw-retained implant provisional was already in situ. The patient complained about the aesthetics of the provisional, along with difficulties cleaning it.

A close-up view of the patient’s smile (Figure 2) revealed the screw access holes on the buccal side of the provisional, indicating that both the implant positions and axes were prosthetically compromised.

The severely compromised positions of the implants (Branemark, Nobel Biocare, Sweden) is illustrated in Figures 3 and 4. Note the different diameters of the implants placed in the anterior and posterior regions, and the ‘sleeping’ implants. The patient’s main desire was a fixed reconstruction with good aesthetics and function. He was not willing to accept a removable alternative.

Lateral and occlusal views of the implant provisional (Figures 5–8) illustrate the over-contouring, which made it difficult to clean the provisional adequately. Plaque accumulation is evident. After the removal of the provisional the severely inflamed peri-implant mucosa were clearly visible (Figures 9 and 10).

In order to evaluate whether or not a fixed reconstruction was possible at all, fixture-level impressions of both jaws were made (Figures 11 and 12), and the axes of the implants were analysed in collaboration with the dental technician.

Thereafter a set-up of the ideal prosthetic position of the teeth was made (Figure 13). Note the position of the implant in region 31, which was too lingual (Figure 14).

A try-in of the set-up and extraoral aesthetic analysis of the planned tooth positions in upper and lower jaws (Figure 15) illustrated that he set-up achieved a harmonious smile line. However, the intraoral analysis of this ‘ideal’ set-up exposed problems: note the intermediate and buccal positions of most of the implants (Figure 16).
In order to accomplish the desired prosthetic outcome, customised cast metal frameworks had to be fabricated, modifying the prosthetic positions (Figures 17 and 18). Furthermore, in the maxillary anterior region 15–30° angled abutments (multi-unit, Nobel Biocare, Sweden) were used in combination with the customised framework. In order to overcome the difficulties with the transfer of the respective angled abutments from the master cast to the clinical situation a positioning stent was made by the technician (Figures 19 and 20). Note the correction of the bucco-oral axis accomplished by means of the angled abutment (Figure 21). Figures 22 and 23 shows a detailed view of final screw-retained metal-resin bridges 17–15, 13–23, 25–27, 37–31, 41–47.

The critical areas of the final reconstructions (Figure 24) were designed to be as easy to clean as possible while maintaining the aesthetics. The interdental regions made cleaning straightforward, as shown in these lateral views (Figures 25 and 26).

Smile line with final reconstructions. The use of angled abutments and a customised framework support meant the screw access holes could be located on the palatal/lingual side of the reconstructions, thereby avoiding impairing the aesthetic outcome. This optimised the smile line when the final reconstructions were in place (Figure 27).

Patient reference portraits (Figures 28 and 29) show the natural teeth and the implant supported reconstructions. A night-guard (Figure 30) was provided after finalisation to protect the reconstructions from the high biting forces.

Discussion

This case demonstrates one approach for prosthetically solving the problem of critically positioned implants. The clinical situation presented highlights the importance of carrying out thorough pre-treatment prosthetic diagnostics prior to implant surgery.

Pre-treatment diagnostics should encompass the fabrication of a wax-up/set-up of the desired outcome, a clinical try-in and the analysis of the individual anatomy in combination with the patient’s main desires. This first treatment phase determines the individual prosthetic goal, which is then used to establish the optimal placement of the implants for the prosthesis.

By using the clinically approved wax-up/set-up to fabricate surgical stents, the prosthetic goal should transfer accurately to the implant surgery.

More recently, computerised technology has enabled planning of the prosthetically ideal implant position within a virtual environment (guided surgery software). Information obtained from this process can be transferred to the clinic by means of surgical stents, enabling a guided surgical procedure.

The need to compensate for non-prosthetically oriented implant positions frequently leads to compromises of the final outcome

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